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EXAMINER
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GENACK, MATTHEW W

ART UNIT	PAPER NUMBER
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2645

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/922,442	Applicant(s) LIANG ET AL.	
	Examiner Matthew W. Genack	Art Unit 2645	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Oath/Declaration***

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not identify the foreign application for patent or inventor's certificate on which priority is claimed pursuant to 37 CFR 1.55, and any foreign application having a filing date before that of the application on which priority is claimed, by specifying the application number, country, day, month and year of its filing.

### ***Drawings***

2. The informal drawings are not of sufficient quality to permit examination due to their lack of reference numbers. Accordingly, replacement drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to this Office action. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action.

Applicant is given a TWO MONTH time period to submit new drawings in compliance with 37 CFR 1.81. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a). Failure to timely submit replacement drawing sheets will result in ABANDONMENT of the application.

### ***Specification***

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3. The disclosure is objected to because of the following informalities: the phrase "Singapore patent application No." on Page 18, Line 20 is not followed by an application number.

Appropriate correction is required.

***Claim Objections***

4. Claim 3 is objected to because of the following informality: the acronym "DOA" is not defined. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, because the phrase "said combinations of arriving uplink signal" in Line 8 is self-contradictory, since a combination involves a plurality of items, and "signal" is singular. Examiner interprets said Claim such that said phrase is replaced with "said combinations of arriving uplink signals".

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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7. Claims 1 and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Youssefmir *et. al.*, U.S. Patent No. 6,141,567.

Regarding Claim 1, Youssefmir *et. al.* discloses a method for adaptively constructing downlink signals in a frequency division duplex wireless communication system that comprises a base station with a smart antenna array and a plurality of remote terminals (Abstract, Column 3 Line 66 to Column 4 Line 6, Column 4 Lines 32-37, Column 5 Line 64 to Column 6 Line 5). The base station smart antenna array receives combinations of uplink signals from the plurality of remote terminals (Column 6 Lines 12-16, Fig. 1). The uplink beamforming weight vector for a given remote terminal is estimated based on received uplink signals (Column 6 Lines 12-32, Column 10 Lines 24-34, Column 11 Lines 28-56). Uplink nulls and the uplink main beam position are identified from the uplink weights (Column 4 Lines 19-28, Column 18 Lines 4-10). Uplink null and beam information are used to appropriately place downlink nulls and in the computation of downlink beam weights (Column 17 Line 37 to Column 18 Line 10). A set of information signals is transmitted from the base station in accordance with the downlink beam weights (Column 3 Lines 20-23, Column 5 Line 64 to Column 6 Line 5).

Regarding Claim 7, Youssefmir *et. al.* discloses a method for adaptively constructing downlink signals in a frequency division duplex wireless communication system that comprises a base station with a smart antenna array and a plurality of remote terminals (Abstract, Column 3 Line 66 to Column 4 Line 6, Column 4 Lines 32-37, Column 5 Line 64 to Column 6 Line 5). The base station smart antenna array has a uniform spacing between elements (Fig. 2). The base station smart antenna array

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receives combinations of uplink signals from the plurality of remote terminals (Column 6 Lines 12-16, Fig. 1). The uplink beamforming weight vector for a given remote terminal is estimated based on received uplink signals (Column 6 Lines 12-32, Column 10 Lines 24-34, Column 11 Lines 28-56). Uplink nulls and the uplink main beam position are identified from the uplink weights (Column 4 Lines 19-28, Column 18 Lines 4-10). Uplink null and beam information are used to appropriately place downlink nulls and in the computation of downlink beam weights (Column 17 Line 37 to Column 18 Line 10). A set of information signals is transmitted from the base station in accordance with the downlink beam weights (Column 3 Lines 20-23, Column 5 Line 64 to Column 6 Line 5).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Youssefmir *et. al.* in view of Bakhru, U.S. Patent No. 4,173,759, further in view of Dent, U.S. Patent No. 5,555,257.

Regarding Claim 2, Youssefmir *et. al.* discloses every limitation of Claim 1, upon which Claim 2 depends, as outlined above.

Youssefmir *et. al.* does not expressly disclose the categorization of uplink nulls into good uplink nulls and bad uplink nulls, nor the reassignment of said bad uplink nulls in such a way as to form corrected uplink nulls.

Bakhru teaches that a problem encountered with certain antenna arrays is the existence of a null in the exact direction that an information signal is being received (thus, an uplink signal) from, and that the disclosed invention remedies this problem (Column 1 Lines 39-46). In the disclosed invention, the antenna array's receiving pattern is steered so that the nulls are not in the direction of the desired information signal, but rather in the direction of sources of interference, and the main lobes are in the direction of the desired information signals (Column 2 Lines 31-41).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* by identifying unwanted uplink nulls that are in the direction of desired information signals and moving said unwanted uplink nulls to other directions (preferably in the direction of interfering signals).

One of ordinary skill in the art would have been motivated to make this modification because such a categorization and movement of unwanted uplink nulls is useful for reducing uplink interference and consequently allowing for higher uplink data rates.

Neither Youssefmir *et. al.* nor Bakhru discloses the practice of scaling the phases of antenna patterns according to a factor that is related to the ratio of the downlink operating frequency and the uplink operating frequency.

Dent discloses the practice of scaling the relative phases of antenna array element signals according to a factor that is related to the ratio of the uplink wavelength and the downlink wavelength (wavelength being inversely proportional to frequency)

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(Column 30 Lines 50-56) in the context of cellular/satellite communication system (Abstract).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* as modified by Bakhru by scaling the phases of wanted uplink nulls and corrected (shifted) unwanted uplink nulls according to a factor that is related to the ratio of the downlink operating frequency and the uplink operating frequency.

One of ordinary skill in the art would have been motivated to make this modification because it allows the optimization of system performance according to whatever uplink and downlink frequencies are being used, and thereby provides flexibility.

Regarding Claim 6, it was mentioned above, in the rejection of Claim 2, that Bakhru discloses that the antenna array's receiving pattern is steered so that the nulls are not in the direction of the desired information signal, but rather in the direction of sources of interference, and the main lobes are in the direction of the desired information signals.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Youssefmir *et. al.* in view of Bakhru, further in view of Dent, further in view of Toda, U.S. Patent No. 6,411,015.

Youssefmir *et. al.* in view of Bakhru, further in view of Dent discloses every limitation of Claim 2, upon which Claim 3 depends, as outlined above.



Neither Youssefmir *et. al.*, nor Bakhru, nor Dent discloses an antenna pattern minimum angle condition whereby said minimum angle is equal to the arcsine of an argument involving the ratio of a downlink wavelength to an element spacing.

Toda discloses a multiple piezoelectric transducer array (Abstract, Column 1 Line 66 to Column 2 Line 15). Toda discloses an electromagnetic pattern array condition for the angle between the main lobe and a side lobe, whereby  $\theta = \arcsin(\lambda/P)$ , where  $\theta$  is the aforementioned angle,  $\lambda$  is the wavelength, and  $P$  is the spacing between elements of the array (Column 5 Lines 5-22, Fig. 7).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* as modified by Bakhru, further modified by Dent by categorizing an uplink null as bad if it satisfies the condition of being greater than an angle  $\theta = \arcsin((\lambda_d/Z) - 1)$ , whereby  $\lambda_d$  is the downlink wavelength and  $Z$  is the antenna array element spacing, and if its corresponding pseudo null in the downlink pattern lies within a specified proximity of the main beam position.

One of ordinary skill in the art would have been motivated to make this modification because it provides a precise means of determining whether or not a given uplink null is capable of hindering the performance of the communication system.

11. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Youssefmir *et. al.* in view of Bakhru, further in view of Dent, further in view of Shafai, U.S. Patent No. 4,947,178.

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Youssefmir *et. al.* in view of Bakhru, further in view of Dent discloses every limitation of Claim 3, upon which Claims 4-5 depend, as outlined above.

Neither Youssefmir *et. al.*, nor Bakhru, nor Dent expressly discloses the step of resetting an unwanted null to 0 degrees or to anywhere within an interval of directions centered on 0 degrees.

Shafai discloses a novel scanning array antenna (Abstract, Column 1 Lines 60-66). When this antenna moves from the  $n = 1$  mode to higher order modes, a null is placed along the  $\theta = 0$  degrees direction, where there was formerly a radiation peak for the  $n = 1$  mode (Column 3 Lines 33-47, Figs. 1-2).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* as modified by Bakhru, further modified by Dent by providing a step whereby unwanted nulls in the antenna array radiation pattern are set to the  $\theta = 0$  degrees direction (which is in the interval  $[-X, X]$  for any real number  $X$ ).

One of ordinary skill in the art would have been motivated to make this modification because the step whereby an unwanted null is moved helps to reduce interference, and thereby allows higher data rates in the communication system.

12. Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Youssefmir *et. al.* in view of Castellon *et. al.*, U.S. Patent No. 5,714,932.

Youssefmir *et. al.* discloses every limitation of Claim 7, upon which Claim 8 depends, as outlined above.

Youssefmir *et. al.* does not expressly state the separation between the elements of the array of the disclosed invention.

Castellon *et. al.* discloses an antenna array, the elements of which are less than or equal to one half of the RF carrier wavelength (Column 14 Lines 43-55, Fig. 1).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* by explicitly specifying element separations of less than or equal to one half of the downlink wavelength.

One of ordinary skill in the art would have been motivated to make this modification because it would help prevent unwanted nulls being in directions whereby the levels of power received by terminals in those directions are severely reduced.

Regarding Claim 10, one quarter of the sum of the downlink wavelength and the uplink wavelength is equal to the average value of one half of the downlink wavelength and one half of the uplink wavelength. Castellon *et. al.* discloses an antenna array, the elements of which may be equal to one half of the RF carrier wavelength (Column 14 Lines 43-55, Fig. 1).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* by explicitly specifying element separations equal to one quarter of the sum of the downlink wavelength and the uplink wavelength.

One of ordinary skill in the art would have been motivated to make this modification as a way to attain an antenna array element spacing value that is

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approximately (due to the fact that the uplink frequency and the downlink frequency are usually relatively close) one half wavelength for both the uplink and the downlink, and thereby enjoy the null correcting advantages associated with one half wavelength array element spacing for both the uplink and the downlink.

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Youssefmir *et. al.* in view of Castellon *et. al.*, further in view of Bryanos *et. al.*, U.S. Patent No. 5,349,364.

Youssefmir *et. al.* discloses every limitation of Claim 7, upon which Claim 9 depends, as outlined above.

Youssefmir *et. al.* does not expressly state the separation between the elements of the array of the disclosed invention.

Castellon *et. al.* discloses an antenna array, the elements of which are less than or equal to one half of the RF carrier wavelength (Column 14 Lines 43-55, Fig. 1).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* by explicitly specifying element separations of less than or equal to one half of the uplink wavelength.

One of ordinary skill in the art would have been motivated to make this modification because it would help prevent unwanted nulls being in directions whereby the levels of power received from terminals in those directions are severely reduced.

Neither Youssefmir *et. al.* nor Castellon *et. al.* discloses separation between array elements greater than half of the carrier wavelength.

Bryanos *et. al.* teaches the use of an antenna array that provides beam scanning that has elements separated by more than one half of the wavelength (Column 1 Lines 18-42).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* as modified by Castellon *et. al.* by explicitly specifying element separations of greater than one half of the downlink wavelength.

One of ordinary skill in the art would have been motivated to make this modification because it would help prevent unwanted nulls being in directions whereby the levels of power received from and by terminals in those directions are severely reduced.

14. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Youssefmir *et. al.* in view of Dent, further in view of Bakhru.

Youssefmir *et. al.* discloses a method for adaptively constructing downlink signals in a frequency division duplex wireless communication system that comprises a base station with a smart antenna array and a plurality of remote terminals (Abstract, Column 3 Line 66 to Column 4 Line 6, Column 4 Lines 32-37, Column 5 Line 64 to Column 6 Line 5). The base station smart antenna array receives combinations of uplink signals from the plurality of remote terminals (Column 6 Lines 12-16, Fig. 1). The uplink beamforming weight vector for a given remote terminal is estimated based on received uplink signals (Column 6 Lines 12-32, Column 10 Lines 24-34, Column 11 Lines 28-56). Uplink nulls and the uplink main beam position are identified from the

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uplink weights (Column 4 Lines 19-28, Column 18 Lines 4-10). Uplink null and beam information are used to appropriately place downlink nulls and in the computation of downlink beam weights (Column 17 Line 37 to Column 18 Line 10). A set of information signals is transmitted from the base station in accordance with the downlink beam weights (Column 3 Lines 20-23, Column 5 Line 64 to Column 6 Line 5).

Youssefmir *et. al.* does not expressly disclose the division of a communication cell into a plurality of sectors and the identification of uplink nulls that may yield a pseudo null in a given sector.

Dent teaches the practice of illuminating a cell from its geographic center, and dividing said cell into three 120 degree sectors (Column 1 Line 58 to Column 2 Line 10).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* by dividing the communication cell served by the antenna array into a plurality of sectors.

One of ordinary skill in the art would have been motivated to make this modification because it would help reduce interference and increase frequency re-use.

Neither Youssefmir *et. al.* nor Dent expressly discloses the identification of unwanted uplink nulls.

Bakhru teaches that a problem encountered with certain antenna arrays is the existence of a null in the exact direction that an information signal is being received (thus, an uplink signal) from, and that the disclosed invention remedies this problem (Column 1 Lines 39-46).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* as modified by Dent by providing for the identification of uplink nulls that may degrade performance in a given sector.

One of ordinary skill in the art would have been motivated to make this modification because it would help reduce interference and thereby improve uplink data rates.

15. Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Youssefmir *et. al.* in view of Boros *et. al.*, U.S. Patent No. 6,615,024.

Youssefmir *et. al.* discloses a frequency division duplex wireless communication system that comprises a base station with a smart antenna array, capable of transmitting and receiving (uplink and downlink), and a plurality of remote terminals (Abstract, Column 3 Line 66 to Column 4 Line 6, Column 4 Lines 32-37, Column 5 Line 64 to Column 6 Line 5). The base station smart antenna array receives combinations of uplink signals from the plurality of remote terminals on different uplink channels (Column 6 Lines 12-16, Fig. 1). The uplink beamforming weight vector for a given remote terminal is estimated based on received uplink signals (Column 6 Lines 12-32, Column 10 Lines 24-34, Column 11 Lines 28-56). Uplink nulls and the uplink main beam position are identified from the uplink weights (Column 4 Lines 19-28, Column 18 Lines 4-10). Uplink null and beam information are used to appropriately place downlink nulls and in the computation of downlink beam weights (Column 17 Line 37 to Column 18 Line 10). A set of information signals is transmitted from the base station in

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accordance with the downlink beam weights (Column 3 Lines 20-23, Column 5 Line 64 to Column 6 Line 5).

*Youssefmir et. al.* does not expressly disclose the presence of a downlink weight generator in the base station, nor the means to move downlink nulls to a safe position.

*Boros et. al.* discloses a transmit weight generator for generating downlink weights based on differences between the phases and gains of the uplink and downlink signal paths, and the means to place nulls in positions so as to minimize interference to co-channel users (Column 13 Lines 19-49).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of *Youssefmir et. al.* by incorporating a downlink weight generator in the base station that generates downlink weights based on a signal's uplink characteristics, and giving said base station the means to move downlink nulls to a safe position.

One of ordinary skill in the art would have been motivated to make this modification so that a high number of users in close proximity can use the wireless communication system.

16. Claims 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Youssefmir et. al.* in view of *Boros et. al.*, further in view of *Bryanos et. al.*

Further in view of the rejection of Claim 12, which is nearly identical to Claim 13, *Bryanos et. al.* teaches the use of an antenna array that provides beam scanning that



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has elements separated by more than one half of the wavelength (Column 1 Lines 18-42).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* as modified by Boros *et. al.* by explicitly specifying an array element separation.

One of ordinary skill in the art would have been motivated to make this modification because it would help prevent unwanted nulls being in directions whereby the levels of power received from and by terminals in those directions are severely reduced.

17. Claims 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Youssefmir *et. al.* in view of Boros *et. al.*, further in view of Dent.

Further in view of the rejection of Claim 12, which is nearly identical to Claim 14, Dent teaches the practice of illuminating a cell from its geographic center, and dividing said cell into three 120 degree sectors (Column 1 Line 58 to Column 2 Line 10).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Youssefmir *et. al.* as modified by Boros *et. al.* by dividing the communication cell served by the antenna array into a plurality of sectors.

One of ordinary skill in the art would have been motivated to make this modification because it would help reduce interference and increase frequency re-use.

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**Conclusion**

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew W. Genack whose telephone number is 571-272-7541. The examiner can normally be reached on FLEX.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fan Tsang can be reached on 571-272-7547. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew Genack

Examiner

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*Matthew Genack*

27 June 2005

*ROLAND G. FOSTER*  
PRIMARY PATENT EXAMINER